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Sexual dimorphism of insects and conditions of its manifestation

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Abstract

The studies of sexual dimorphism (SD) interspecific change by size is generally state that intraspecific value of this parameter is a stable one. This paper presents the results of sexual dimorphism systematic study according to measuring signs of Coleoptera, Carabidae bugs. The samples of six eurytopic individuals among widespread species were taken in a large-scale aspect - in the most part of the area, in the spectrum of a human impact and different vegetation habitats - and integrated into a single database, original for each species. More than 15,000 individuals were studied in total. Among all studied species of ground beetles females are larger than males according to all measurements. Using the second type of the reduced regression models allowed to show that the slope angle of the regression curve for male and female sizes is a positive one, which indicates that the change of female size has one vector with the changes of male size, but the magnitudes of regression coefficients differ among different species. The values of model constants have different signs. These facts are indicate that the studied species of ground beetles are divided into two groups with respect to environmental factor sensitivity: the first group (Carabus granulatus, Carabus hortensis, Pterostichus niger, Pterostichus oblongopunctatus) is more sensitive to changes in the female environment, and will be reduced with the increase of SD damaging effects in the populations of these species. The second group (Carabus cancellatus, Carabus aeruginosus, Pterostichus melanarius, Calathus halensis) includes the species with more sensitive males, and in the harsh environmental conditions among the populations of these species SD will be increased. Thus, we developed the method of secured bioindication for external impacts on biota, based on the assessment of SD value orientation changes in the populations of ground beetles.

Keywords

Bioindication, Ground beetles, Rench rule, Sexual dimorphism by sizes, The regression models of the second type II